SAFETY & HEALTH LEARNING ALLIANCE

# LEADING INDICATORS
# The Elusive "Holy Grail" of Safety and Health Risk Management

June 20, 2013
1-2:30 p.m. (EST)

## Presenters

- **Gary DeMoss**, Chief, Performance & Reliability Branch, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission (NRC)
- **Jeff Ruebesam**, Vice President, Health, Safety & Environmental (HSE), Fluor
- **David Loyd**, Chief, Safety & Test Operations Division, NASA Johnson Space Center (JSC)

## Summary

**Facilitator**: Mike Lipka, NASA Safety Center

**Attendees**: 69

**Purpose of the Safety and Health Learning Alliance**: Share experiences and collaborate ideas across various government and defense agencies, related industries, and professional organizations for the mutual goal of achieving high levels of safety and health.

**Goal**: Increase involvement, communication, and participation among safety and health professionals.

The SHLA website includes a video of the presentation. Please submit questions, comments, and event recommendations on the website or by emailing NASA-NSC@nasa.gov.

## Guest Speakers

### ➢ GARY DEMOSS, CHIEF, PERFORMANCE & RELIABILITY BRANCH, OFFICE OF NUCLEAR REGULATORY COMMISSION

***Performance Indicators*** (purposefully does not use the word "leading")

It is hard to really know if an indicator is leading or not. NRC uses performance indicators for the Reactor Oversight Program, which is the inspection program for all regional offices. When a problem is identified, additional resources are applied. Thresholds are set appropriately for each area. This program replaced the management-driven system where managers had complete control where they focused on inspections.

- Use probabilistic risk evaluation methods for prediction
- Anyone can go to the NRA website for reactor information by location
- NRC tracks licensees, emergency preparedness, and radiation safety on-site and emitted
- Sometimes the color codes can be "fuzzy" as management and enforcement responses/opinions may differ

***Industry Trends Program*** (actual calculation property of significant events)

- Look at long-term and short-term trends
- Use risk index (probabilistic risk assessment)
- Evaluate curves and discrepancies
- Watch for long term trends
- Evaluate for changes and causes of changes
- Elevate issues
- Probability risk assessments used in decision making

***Questions for DeMoss***

**Q. Could a scram be considered a lagging indicator?**

*The scram is considered a lagging indicator. It could be a leading indicator into poor licensing performance or procedural compliance. Anything that is tracked can likely be a lagging indicator. It's an engineering thought process.*

**Q. Why are some decisions risk informed and some are not?**

*Risk models cover reactor's safety up to core damage or in some cases up to public release. They look at low frequency, high consequence events. We don't have risk models for many indicators and no risk-focused risk indicators for emergency preparedness. Can elaborate further off-line.*

**Q. If people were to remember only *one* thing about leading indicators, it should be**

*The "leading-ness" of indicators is not there statistically, but will guide you in what to look at.*

➢ **JEFF RUEBESAM, VICE PRESIDENT OF HSE, FLUOR CORPORATION**

- Start all meetings with four or more employees with an HSE topic
- All employees are measured on HSE performance
- Management evaluations are tied to HSE performance
- Leading indicators are measured by corporate audits
- Corrective measures applied, but place importance on being proactive for preventative measures
- Audit about 100 projects per year
- Corporate leading indication focus
- Assess how we work on positive HSE culture with sub-contractors
- Determine if our training and expectations are well communicated
- Get out to the field often and evaluate how effectively HSE programs and activities are performing
- Audit tool improvements help capture and measure information better
- Sites are allowed to customize the audit material based on particular activities and the local impacts
- Quality checks on STAs to assure quality measures are being utilized
- Senior management performs a weekly walk-through, documents areas that need attention and follows up
- Leadership training is very important
- It is important to build trust; if management is involved in all aspects of safety, then workers trust them

- Data mining all audit information helps us focus on areas in need of improvement
- Evaluate data and identify corrective measures when analyzing data
- If audit results are under-acceptable, all persons, at all levels, must attend a meeting with the VP of HSE; this has been helpful in achieving acceptable audit results

***Questions for Jeff Ruebesam***

**Q. How do you prioritize what project will be reviewed when looking at an annual schedule of 1,000 projects with only 100 audits?**

*Three levels of criteria are looked at:*

1. *Each leader submits sites they would like reviewed, representative of activities*
2. *Match global footprint*
3. *Represent the various sizes of the projects*

**Q. Do you relate or combine mishap statistical data with audit finding data to determine a leading or lagging indicator?**

*The mishaps or events that take place at sites are handled apart from the leading indicator program. We look at where we have systemic weaknesses and consider that event data as well.*

**Q. How long did it take to get the leadership trained?**

*About 4 months total, with 2 months to develop the training and 2 months to perform training. Culture change was accomplished in a short time. Expectations and consequences stated. Now it is a natural process.*

**Q. Is event mishap data associated with audit data?**

*Mishaps are considered something that happened at a site. When a mishap occurs, we manage it. Leading Indicators are considered when we perform audits focused on observing normal operations during that audit. We do our homework about site history before performing the audit.*

**Q. How do you collect audit data?**

*We developed an Excel spreadsheet-based system from scratch internally. Easy to collect and aggregate data.*

**Q. Within your score audit process, do you place different weighting on keys/terms, depending on what they are, in order to score a pass/fail?**

*The first three section, which talk about developing and communicating the plan, management and action, and training and culture, are weighted at 20 percent each. Field operations are weighted at 40 percent. We have some individual line item criteria we also evaluate by severity. If high severity issues are found, then it is an automatic audit fail.*

**Q. Are best practices or models available to record safety management performance and effectiveness to evaluate safety and health?**

*Annual performance appraisals do not include numeric results of injury data. They are focused on the activity level of the manager showing his or her personal involvement in safety programs. I will provide the descriptive criteria we use to measure HSE management to Mike Lipka to share.*

**Q. What level of management is required to visit areas for safety two times per week? And is that management's own area or different areas?**

*Anyone above the supervisor level is required to go into the field two times a week and meet with a work group, first thing in the morning, and participate in safety planning for that day. Supervisors are already involved in these activities with their crews. Site managers, superintendents, and construction managers will be involved in a walk-around of the entire site at least once a week, and all findings will be documented and tracked to closure.*

**Q. If people were to remember only *one* thing about leading indicators, it should be**

*Help promote a proactive instead of a reactive safety culture. Do quality checks and work on prevention.*

➢ **DAVID LOYD, CHIEF SAFETY AND TEST OPERATIONS DIVISION, NASA JSC**

- Mainly we base things on "reality"
- We focus on predictive measures; lagging indicators are important as they show reality
- Understand how to place mishaps into the equation to really determine the final results
- Can't dismiss lagging indicators
- Make a difference in lagging indicators by looking at leading indicators
- Four buckets to measure performance in safety
    - This concept is beyond the numbers; the criteria is used in our procurement process
    - All JSC contractors are required to meet performance
    - Also included internal for civil servants
- Some results are subjective and some are measurable; results need to be looked at based on context and need to meet one or more of our criteria
- Objectives are qualitatively and quantitatively assessed
- Look at the numbers and the context of what the subjective data is telling us
- Focus on where we are improving or declining
- BP is a good example of how to identify and utilize leading indicators and utilize data

***Questions for David Loyd***

**Q. Are survey questions something you designed or were someone else's questions utilized?**

*Dr. Tracy Dillinger's group has guided a collaborated effort to collect questions. Advance Survey Design assists Dr. Dillinger with development. She and her team focus on developing safety culture at NASA.*

**Q. Do other agencies have examples or suggestions to predict occurrences?**

*Cannot predict when, by who, or on what the next mishap might occur, but may be able to predict where it will happen. Currently, we are working with Liberty Mutual to identify and understand work environments and recognize potential issues that may identify a high risk environment.*

**Q. If people were to remember only *one* thing about leading indicators, it should be**

*Don't rely on any one or short set of measures. Look from all or many perspectives. Never look at just one conclusion. Always check against other date.*

## Final comments and Questions for Guest Speakers

**Q. Can we list attendees for this meeting?**

*No, due to privacy issues, we cannot.*

## Poll Questions for Participants

Poll questions give a quick picture of leading indicators in your organizations. Responses are anonymous.

**What are the top 2-3 leading indicators that you track within your organization?**

- Hazard identification
- Reactor trips (upsets) are probably our most tracked indicators; it may not really be leading
- Hazards, incident near misses, and corrective action closure timeliness
- Leadership safety forum participation, safety culture, and close call process participation
- Safety conversation conducted by supervisors with employees, hazard elimination projects that involve engineering solutions, and top ten risk assessments completed by departments
- Injuries, complaints, and costs
- Audit conformance, culture survey, and activity prior to mishap
- Safety facilitates safety inspections, and close calls
- Days to close mishap recommendations, MFOQA aircrafts events, and safety climate survey participation
- Close call reports
- Training, behavior-based safety metrics, and corrective/preventive actions
- Inspections
- Number of people trained for a certain program in relation to those required, number of days to complete survey from date of request, and number of samples collected

**On a scale of 1-5 (where 5 is the most effective and 1 is the least effective), please rate your current efforts to track leading indicators in your organization.**

| Rating Scale | Respondents | % Selected |
|---|---|---|
| 5 High | 6 | 30% |
| 4 High/Med | 3 | 15% |
| 3 Medium | 10 | 50% |
| 2 Med/Low | 1 | 5% |
| 1 Low | 0 | 0% |
| **TOTAL** | **20** | **100%** |

**What is your organization doing to improve identification and tracking of leading indicators?**

- Encourage reporting of near misses
- Employee campaign to promote hazard identification, as well as implementation of an organization-wide EHS management system database solution
- Tracking at numerous levels—AF Safety Center level, MAJCOM levels, Base levels, and Unit levels (helps to narrow indicators)
- We just keep looking and getting ideas from others
- We are benchmarking with a number of Fortune 200 companies and participating in various association and work groups
- Communication and training efforts
- Research into predictive analytics, log-log risk plots, and benchmarking others
- Do a better job using the data collected
- Improving electronic management systems
- Standardizing across organizations and increasing level of visibility
- Reporting indicators to senior management monthly and using educational venues to educate employees on ways to correct identified deficiencies through trend analysis
- Adding more resources to track the indicators and make it easier for everyone to provide data